Alim Nizari, Christopher Kassner, Yuzhuo Ye, Thomas Chiu

Project Phase 4: Report

The Game

Our game takes place in a dark and gloomy maze-like dungeon, from which our protagonist seeks to escape. However, escape is only possible by collecting all of the various key fragments scattered across the map to form a key in order to unlock the exit at the end of the maze. While navigating the maze, our protagonist is constantly being chased by bats, as well as trying to avoid traps and trying to collect gold coins which act as bonus rewards. The player wins the game by exiting the maze, or loses the game by running into a bat or having their overall score fall below zero. The game's score is set to 100 at the beginning, and increases by 100 per key fragment collected, or 200 per gold coin collected, as well as decreasing by 100 by stepping over any traps. Our game is loosely inspired by 2D dungeon crawling action-adventure games such as The Legend of Zelda for the NES.

Our final product is significantly different from what we first envisioned during the development phase of the project, specifically in terms of the implementation of our overall coding structure and design. As our project gradually got larger and began involving hundreds of lines of codes with many files, as well as when we began adding test cases to our project, we continually refactored our code as necessary. However, the general themes and environment of our game remain largely unchanged from the development phase. Ultimately, we had to scale down the overall ambitiousness of our project because of various real world constraints such as deadlines. For example, we had originally planned on having multiple types of moving enemies and bonus rewards, but ended up only implementing one of each, as other concerns were of a higher priority. Similarly, we didn't end up implementing various UI features such as a volume slider or various language options due to prioritization of tasks.

The justification for the various changes and refactoring during our game's development such as dividing one large file into multiple separate files is much cleaner code with lower coupling and higher cohesion. This allows us to further modify the game as desirable more easily without having to change many different files or modules that were previously highly interdependent. The most important lesson we've learned during the entire process is the importance of writing robust and easily malleable code, as well as continually refactoring as appropriate and avoiding anti-patterns such as having one large method dealing with multiple functionalities. Each method should do one thing only. There are several other lessons we've learned such as appropriately naming methods and leaving comments so that the code is easily readable and understandable, as well as the importance of writing tests and proper documentation, as none of us had prior experience creating a project of this magnitude. Furthermore, we learned various lessons unrelated to the actual coding process itself, such as the importance of functional group dynamics and communication, as it takes more than one person to successfully develop a large project such as a game. Also, we learned the importance of the categorization and prioritization of tasks in order to meet deadlines. Essentially, from the design

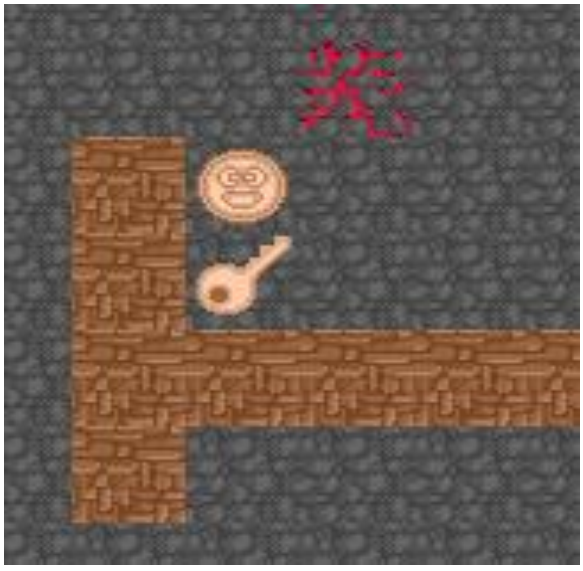
phase to the implementation phase and the testing phase, the entire process was one of continually learning and improving in both technical and non-technical aspects.

The Tutorial

Our game presents you with a very simple start menu that says, "Press space to start," and in the event that the space button is pressed, the game will start.

Once the game starts, you are shown the full 32 x 32 tile map and the player spawns at the bottom of the map. The score, timer, and remaining key fragments are kept track at the top of the game window. The objective of the game is to navigate your way throughout the maze collecting all the key fragments while avoiding the various traps and enemies. Navigation is controlled by the WASD keys: W is up, A is left, S is down, and D is right. The exit at the top of the map will only open once all key fragments have been collected. The enemies in the game are bats that move towards the player when they reach a certain distance from them. Avoiding the bats is necessary for the player to complete the game.The game instantly ends if either an enemy bat comes into contact with the player or if the player score goes below zero.

There are three different items in the game: key fragments, bonus coins, and traps, as is shown in the following screenshot. The key fragment rewards the player with +100 to their score and the bonus coin rewards the player with +200 to their score whereas the traps/punishments decrease the score by 100 each. Key fragments and traps spawn in set locations on the map, and are permanently removed once the player comes in contact with them. The bonus coins spawn in random locations on the map every 5 seconds, and there can only be one one the map at any point, so grab them while you can!



If in the event that you lose the game by either coming into contact with an enemy or the score going below zero, the game will display the game over screen as the photo to the right shows. You must restart the game in order for you to play again.

Once the player collects all key fragments, the exit will open and the player will be able to walk through the exit to win the game.

If the player successfully reaches the exit and with all the key fragments then the game will display the winning screen. This screen shows the score count after completing the game as well as the time it took you to complete the game which is measured in seconds.